

clay extruder

users guide



tips, techniques, and projects
for getting the most out
of your ceramic extruder



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Clay Extruder Users Guide

Tips, Techniques, and Projects for Getting the Most Out of Your Ceramic Extruder

The ceramic extruder is now commonly seen in a majority of schools and community ceramic centers as well as thousands of private studios. This versatile tool was relatively unknown back in the 1970s, but that's history. Because of its versatility, the clay extruder has embedded itself as an indispensable tool for thousands of potters and ceramic artists.

20 Tips That Will Increase Your Extruder Experience

by Daryl Baird

Here are 20 tips that are sure to improve your success with extruders no matter what. From advice on how to prepare and load the clay to techniques for keeping extrusions straight and free from flaws, these tips are sure to help.



Credit Card Clay Extruder Dies

by Daryl Baird

Nothing helps you learn faster than taking on a simple, yet challenging project. Daryl shows you how to take your old credit cards and make simple extruder dies, then shows you how to make ceramic house numbers with your extrusions.



Twisted Lotion Dispensers

by David Hendley

Extruders can do things not possible with the wheel or handbuilding and here's a good example. David demonstrates how to make his unique lotion bottles. The trick? Carefully twisting the clay extrusion as it exits the extruder.



Rope-top Bucket

by David Hendley

Veteran extruder user David Hendley offers another project that's really simple to do although it looks complicated. He makes a clay rope decoration for his wheel-thrown buckets and adds a wire bale for a handle. To make rope with a ceramic extruder, all you need is a simple die with three holes drilled into it. You'll want to make many sizes because the rope is easy to create once you have the extruder die.



20 Tips to Increase Your Extruder Experience

by Daryl Baird



1 Assemble it correctly. Make sure your extruder is assembled correctly, according to the manufacturer's instructions. If you bought a used or custom-made extruder, ask the person who sold it to you to cover the operation basics, if possible.

2 Use moist clay that has been wedged well. This can't be overstated. Just about any clay can be pushed through an extruder, but the results will vary enormously, depending on the characteristics of each. Clearly some clay bodies are better suited to extruder work than others. As a general rule, any clay in a condition that is well suited for use on a potter's wheel will work well in your extruder. This is not to say that you can't use fresh clay right out of the bag. But if it has been around awhile and it seems a little stiff, it will be more difficult to use in your extruder. You shouldn't have to exert superhuman force to get the clay to move through the die.

3 Practice, practice, and more practice. Just about every tool or instrument requires some practice if you're going to master it. If you're new to extruding, give yourself and the extruder a chance.

4 Working alone? Use the chest press method. Underfill the barrel so the handle is lower and closer to the barrel when you start. Now, standing directly in front of the extruder, square up your stance and press the handle with the center of your chest. This frees both of your hands to guide the clay as it extrudes.

5 Cut off the first few inches. The first part of an extrusion never seems to come out straight. Cut it off squarely, then finish your extrusion. If you're making a hollow extrusion, you can help it to come out straighter by pressing your flattened hand with slight upward pressure against the bottom of the extrusion as you pull on the handle with your other hand.

6 Make a one-handed cut-off wire. Mount one end of a cutting wire or a piece of fishing line on the wall next to the bottom edge of the extruder. Let the other end hang free. After making an extrusion, support it from the bottom with one hand, then grasp the free end of your cutting wire and draw it through the clay along the bottom of your extruder.

7 Center the die. If you want straight extrusions, the opening in the die has to be centered in the barrel directly under the plunger. In a hollow-form die, the internal die pieces have to be centered relative to the perimeter walls of the die.

8 Install dies off-center for curved extrusions. This won't work with some extruders because their dies are fixed in one place, but if you can move yours from side to side or front to back, you might do some experimenting.

9 Use a padded miter box. Use a padded miter box to make clean 90° cuts on the ends of your hollow extrusions. Wait until the extrusion has firmed up to a soft

leather-hard, then lay it in the miter box. Use a cutting wire to cut through the clay using the notches as a guide. Line the bottom of your miter box with a piece of foam padding, which allows you to push your cutting wire all the way through the clay.

10 Slice open a cylinder to make a slab. Cylinders made with an extruder can be cut down one side and laid flat to make a slab. If you have a cylinder die with a diameter of 3 inches, it will yield a slab approximately 9 inches wide. Recalling your high school geometry, the circumference of a circle equals the diameter times 3.14. To minimize warping, turn the slab over, curled edge down, before rolling it flat.

11 Use paddles to help square up things. Square extrusions can be straightened by using two one-by-four-inch boards, each about a foot long. If the inside wall width is smaller than three inches, cut another board to fit inside the extrusion. With your extrusion resting on the table, slide the board inside and apply light downward pressure to flatten the extrusion wall. Hold one of the other boards in each hand and straighten the extrusion from the outside by squeezing the extrusion between the boards. Do this on all sides until the extrusion is square.

12 True up cylinders from the inside out. Truing up cylindrical extrusions can be a little tougher. Look for a tube that fits snugly inside the extrusion after the clay has been allowed to firm up some. If necessary, wrap a tube with some paper to get the correct diameter and secure it with tape. Slide the tube into the extrusion with a twisting motion. If you're making a vessel from the tube, do the straightening before adding the bottom. Otherwise air will get trapped, making it difficult to remove the tube.

13 Save those inner tubes. If the clay leaks outside your screw- or twist-on type die holder, you can make a gasket that rests on the die from an old piece of car inner tube, or from gasket material you can buy at a car parts store.

14 Unlike potter's wheels, which seem to thrive on neglect, extruders need regular cleaning to do their job efficiently. The cleaning requirement can be one of the biggest turnoffs to extruder use, but it doesn't have to be the drudgery some make it.

15 Protect your dies and extend their lives. Spray a light, even coat of a silicone spray like WD-40, or a nonstick pan coating like Pam, over the parts that will be in contact with clay before loading the barrel. Use it sparingly each time you're preparing to use your extruder.

16 Remove clay before it dries. Do not let clay dry on the plunger plate or in the barrel. Dry clay is doubly hard to remove, and pushing the plunger through a barrel encrusted with dry clay can lead to excess wear on the plunger plate. Dried-on clay should be softened with a spray of plain water or a soap solution. It can then be scraped free with a rubber rib.

17 Use cloth scraps to clean your barrel. Placing a piece of dampened denim cloth over the plunger and pushing it through the barrel helps clean the inside walls. If this doesn't move well through the barrel, try a lighter-weight material.

18 Apply more leverage for small-opening dies. If your extruder comes equipped with a short handle and a longer handle, the longer handle will give you more leverage when trying to push clay through a die with a small opening. Having to resort to extra leverage may, however, indicate the need for moister clay. Clay that may seem too moist to handle at first may prove to be ideal when subjected to the extra compression of passing through a small die opening.

19 Make a "gang" die to make coils more easily. Extruding a single, small-diameter coil can be very difficult if your extruder has a large barrel. Too much force is required to push the clay through the small opening. To make the job easier, use a four-place coil die, which is referred to as a "gang" die.

20 Extrude some "test tubes." Small-diameter, hollow tubes cut into short lengths make excellent pieces for testing glazes. Any of the common forms will work, but the hexagonal tube is especially useful. It can be set on end or laid on its side in the kiln to test glaze flow characteristics. Draw a pattern of lines down one side with a fork or a serrated rib. These will help you see how a glaze "breaks" over edges. Scratch code letters and numbers into the leather-hard test tube for identification. Hang these tubes on the wall or tie them to the handle of your glaze bucket with a piece of wire.

Credit Card Extruder Dies

by Daryl Baird

For several years, I had the opportunity to work alongside Jim Robison on the commercial exhibit floor at the annual National Council on Education for the Ceramic Arts (NCECA) conference. We worked the booth like a couple of traveling medicine men. First, Jim would draw the "townsfolk" in by demonstrating his considerable skill with a slab roller and an extruder, then I would sell them on the idea of personally owning one or both of these wonderful pieces of equipment.

I always enjoyed seeing how Jim could easily seize the attention of passers-by while he added beautiful touches to the vases and platters he built in just minutes, using simple tools he found in kitchen shops and paint stores. A pie crust ventilator made subtle scored lines

TIP

Clean the credit card with soap and water before starting to draw on it.



A few simple tools are needed to create dies.

in the clay while a tiny paint roller and a piece of lace trim gave it exquisite texture.

In addition to demonstrating at NCECA, Jim conducts workshops in Europe and North America. Among the most intriguing items he takes with him are the extruder dies he has fashioned from credit cards, membership cards, and coffee cards.

Recently, a friend asked me to make an address sign for her new home. As a devoted "extrudist," I wanted to make the sign, at least partly, with my favorite studio tool. None of the stock dies I had on hand seemed suitable, so I decided to make the shapes I needed using Jim's credit card die construction techniques.

Making a Die

You'll need a few simple tools for making a credit card extruder die (above)—a no. 2 pencil, an indel-



1

Outline your design first in pencil, then use a marker.



2

Cut out the opening, working inside the line.



3

Trim burrs with an X-Acto knife.



4

Sand the die smooth.

TIP

As you clean up the die opening, hold the credit card die up to a bright light. This makes it easier to gauge where more trimming needs to be done.

ible marker with a fine point, a Dremel tool and assorted bits, an X-Acto knife and several No. 11 blades, emory cloth or 150-grit sandpaper, rubbing alcohol, and a small rag. Safety glasses are essential when using the Dremel tool. Optional tools include a hand drill and bits, a scroll saw, a jeweler's saw, and a small vise.

To begin, use a No. 2 pencil with a good eraser to lay out the shape of the die opening. Dull the finish of the card with fine sandpaper if the pencil marks are too light. Go over the pencil drawing with a fine-point, indelible marker, like a Sharpie (*figure 1*). If you

make a mistake, these lines can be removed by wiping the card with a rag dipped in rubbing alcohol.

To cut out the shape you've drawn, a hand-held rotary tool, like the type made by Dremel, works fast (*figure 2*) and is fairly easy to control. These come with a variety of drill bits, along with grinding and sanding bits that can be used to refine the shape of the opening. In addition to using a Dremel tool, I tried cutting out the die shapes with a scroll saw. It worked well, but setting up the saw for this was tedious and time-consuming. I also gave a coping saw and a jeweler's saw a



5

Place the die on an extruder die to check the fit.



6

Attach the die with clay wads to a standard extruder die.

try. Even with a fine-toothed blade installed, the coping saw was next to impossible to use. The jeweler's saw cut more smoothly but it was slower than using a Dremel tool.

Once the opening has been cut out with the Dremel tool, it'll be rough, so you'll need to clean it up. I like using an X-Acto knife with a No. 11 blade to clean up the opening and square-up the corners (*figure 3*). The blades dull quickly when cutting plastic. Have several on hand and change blades often.

Once the die shape is done, use a small piece of sandpaper or emory cloth to clean off any burrs (*figure 4*). I used a narrow strip cut from a foam-backed sanding pad because it fits the contours and corners.

Using a Die

Credit card extruder dies are best suited for use with extruders that have a 3 to 4-inch barrel. Don't try to use credit card dies in large-barreled extruders because these types of extruders will exert too

much pressure on the die, and cause it to crack. For the same reason, you'll achieve the best results by using only a two or three pound charge of very soft, well-wedged clay in the extruder to minimize the stress placed on the die. Place the card on an extruder die with a hole somewhat larger than the hole you just cut. I'm using a North Star standard extruder and the outer part of a small hollow die makes an ideal mounting plate for the credit card die. Looking from the underside, make sure the die is centered (*figure 5*).

Hold the die in place and turn it face up. Use small wads of soft clay to anchor the credit card to the mounting plate (*figure 6*). Then, attach the die to the extruder barrel and load the charge of clay into the extruder barrel carefully so the credit card does not become misaligned.

Evaluate the first extrusion. If areas need to be refined, it's easy to go back and give the shape a little "tune up."

Street Address Project

To illustrate the use of these dies, I made a street address sign for my home. I rolled a large slab of clay that was just under a half-inch thick and cut out the oval shape using a plastic serving platter as a template.

TIP

When working on large, flat projects, use a sheet of drywall as a work surface to minimize warping. Be sure to cover any exposed plaster with Duct tape or similar.

So far, I have three credit card dies in my collection. I used the extrusion from my bull nose shaped die to create a decorative rim for the edge of the clay slab. The height of the notch in the extrusion matches the thickness of the clay slab. Make the bull nose extrusion long enough to cover the entire circumference of the slab and attach it as soon as it's extruded. Spray the slab before attaching the rim and use even pressure all the way around the piece to bond the trim to the slab. No scoring or slip is necessary.

I used a T-shaped die to make the numbers for the sign. The die is 1 1/4 inch wide by 3/4 inch high. The "T" profile is easy to shape while also offering a large surface area on the underside, ensuring a strong bond between the extruded shape and the slab.

Make extrusions of several lengths and shape the numbers on a piece of drywall. Draw the outline of the numbers or letters you want directly onto the drywall, and follow these lines as you lay out the extrusions. If the numbers don't look quite right after the first attempts, you can go back and bend them more.

Keep the extrusions moist as you work. If you're assembling a shape from several extruded pieces, like the number 4 for example, take care to join the pieces thoroughly. This is where you'll need to score well and apply slip to the joints before attaching the parts.

Spray the oval slab with a mist of water and lightly place the numbers on the surface. When each one is properly positioned, repeatedly apply light, even pressure until the numbers are firmly in place. It isn't necessary to distort the shape of the extrusion to achieve good attachment.

Securely wrap the sign in plastic and allow it to "rest" on the drywall sheet for two or three days. Afterwards, slide the sign onto a fresh piece of drywall and lightly cover it with plastic. This will help it dry evenly.



Three credit card dies with distinctly cut shapes in each one.



Slab should match the thickness of the notch on the bull nose extrusion.



A T-shaped extruder die is used for the numbers, which are assembled on drywall.



Address sign, 18 inches long, Laguna Speckled Buff clay glazed with Laguna's Fern Mist, fired to cone 5.

Twisted Lotion Dispensers

by David Hendley



Three finished lotion dispensers, 7 in. (18 cm) in height, handbuilt using extruded parts, with added feet of unglazed dark brown clay and multicolored slip-glazes. Pump dispensers added after glaze firing.

I have been using extruders in my clay work since 1974, after I built my first extruder and made my first dies. I immediately saw the potential for making new forms through extruding, and I've always had an extruder in my studio that I use on a regular basis. Of all the pieces I make, the extruder is used for about two-thirds of them—to produce either the main form itself or an added element for a wheel-thrown vessel. Even my pulled handles start out as extrusions.

Producing work with an extruder seems like it would enable you to make dozens of items quickly, but just the opposite is often true.

Because of all the measuring, cutting, and joining, an extruded pot can require more time to make than a similar, thrown pot, but for some forms, extruding is the most expedient way to go.

As for the dies, manufacturers offer many configurations; however, if you have more than a passing interest in using an extruder, I'd suggest making your own. Designing and making the die is part of the creative process and requires thinking from a different perspective since it's the negative space of the die that produces the form. With practice, you'll soon be able to shift your spatial thinking to where you can easily picture the

**1**

Twist the extrusion as it exits the extruder.

**2**

Use a piece of monofilament fishing line to cut the extrusion.

**3**

Allow extrusions to set up. Turn over after an hour.

**4**

When leather hard, cut extrusions to length.

**5**

Brush on underglazes or vitreous engobes if desired.

three-dimensional piece you'll get from the shape outline cut into a two-dimensional die, and vice versa. In fact, after spending a lot of time and thought designing dies, I often look at everyday objects and mentally picture what the die needed to make them might look like.

Making a Lotion Dispenser

The form for the lotion dispenser is made with a two-part die that produces a $2\frac{1}{2}$ inch square tube. Hollow square tubes are among the most common shapes extruded, but twisting the extrusion

**6**

Round corners and smooth edges of squares.

**7**

Cut arches into the top and bottom of the form.

**8**

Trim the bottom slab flush with the sides.

**9**

Use a tool to compress and bevel the seam.

**10**

Roll the top back and forth to compress the join.

**11**

Cut a 1-inch hole in the top for the pump.

gives a sense of movement to the finished pot.

Lotion dispenser pumps, available from most ceramic supply stores, come in a variety of styles and colors. You'll need to purchase those before you attempt this project so that you can make appropriate design and color choices. The collars need to be attached with adhesive after the glaze firing—check with your supplier for the best combination.

To make the lotion dispenser, load the die into the extruder and fill the extruder barrel with

clay. To minimize air bubbles in the extrusion, shape the clay so it slides easily yet snugly down the barrel. Pull down on the lever of the extruder with one hand while twisting the clay as it exits the extruder with the other hand (*figure 1*). To keep a hollow form from collapsing in on itself as it is twisted, keep your hand right below the die, twisting the clay just as it exits the extruder, and move your hand back up as every inch or so of clay comes out. Any faint thumb indentations left on the clay from the twisting process will not

be perceptible in the finished piece. While this process feels awkward at first, and takes some practice as well as a wide reach, I have no trouble doing the job by myself. You may want to have an assistant slowly pull the handle while you practice the first few times. It also takes some practice to get a feel for how much pressure is required to twist the clay as it comes from the extruder. Not much pressure is required, and most beginners twist too much rather than too little.

When you have a long enough extrusion, cut it loose with a piece of monofilament fishing line. Wrap the fishing line around the extrusion, and allow one end of the line to dig into the clay, which holds it in place. Use one hand to pull the other end of the line through the clay while the other hand supports the extrusion as it is cut loose (*figure 2*).

I always make at least 10 or 12 dispensers at a time because of the significant set-up and clean-up time when extruding through a two-part hollow die. Twisted extrusions are cut off in 18-to-20 inch long sections and set aside to firm up on a table (*figure 3*). In average weather, I allow the sections to dry for about an hour and then flip and allow to dry for another hour. Measure each extrusion and divide it into three 6 to 7 inch long pieces. Use a fettling knife to cut each extrusion (*figure 4*).

For my glazing technique, I apply slip glazes to the sections of twisted square extrusions before adding the tops and bottoms (*figure 5*). Allow the painted surfaces to dry

for several hours before handling and continuing with construction. (After bisque firing, I glaze the top and insides of the dispensers.)

Once the slip glaze is dry, roll out a slab for the tops and bottoms of the dispensers. The slab should be slightly thicker than the walls of the extrusion. Cut the slab into 2½-inch squares, then round and smooth the edges and corners of each square (*figure 6*). Roll each square again to make it slightly thinner and wider (about 2¾ inches square). I roll past the edges to create a softer and slightly wavy edge.

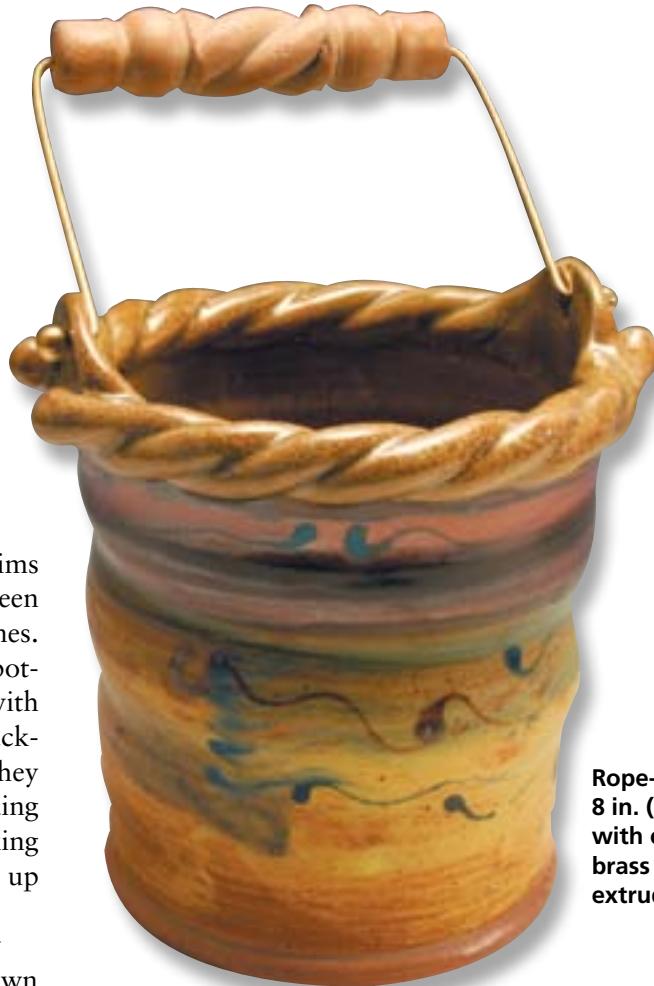
Next, cut raised arches into the top end of the extruded section (*figure 7*). On the bottom of the pot, cut the arch so the four corners become the feet of the piece. Score and slip the bottom edges, attach the bottom slab and trim the edges flush with a cheese slicer or fettling knife (*figure 8*). Roll the handle of a fettling knife along the edges of the bottom at a 45° angle to reinforce the joint and bevel the bottom slab (*figure 9*).

Add the top slab but don't trim it, leave the overhang as a design element. Roll the top back and forth on the table to secure the join (*figure 10*), allow to dry for about an hour, then cover with plastic and leave overnight to equalize the moisture.

On the following day, use a piece of 1-inch tubing to make a hole in the center of the top slab for the lotion pump (*figure 11*). After the glaze firing, a glue-on collar and lotion pump collar will complete the pot.

Rope-top Bucket

by David Hendley



Rope-top bucket,
8 in. (20 cm) in height,
with ceramic and
brass handle and
extruded rim.

Pots with twisted coil rims and handles have been made since ancient times. Lots of beginning pottery students try making pots with twisted coils, but because of cracking during drying and/or firing, they have a high failure rate. Extruding the coils puts an end to cracking problems, as well as speeding up the job considerably.

The main body of this pottery bucket is a straightforward thrown cylinder; the extruded rim and handle that give it a unique look.

To make the bucket, use around 3½ pounds of clay to throw a 6-inch diameter cylinder that's about 7 inches high. When finished, do not cut the pot off of the bat since you'll need to return it to the wheel later to attach the rim. Once the form has set up to leather-hard, lay a twisted rope-like extrusion on the top edge of the pot (*figure 1*), starting with one end and working to the other. Use a cheese cutter or fettling knife to cut the extrusion to the exact length at an angle along the

twisted lines in the extrusion. This will provide more surface area to achieve a good tight joint.

Attach the rim to the pot, inside and outside by gently pushing clay down and into the bucket body, then smooth and blend the join by slowly rotating the wheel and gently "throwing" the juncture. Pinch and extend the rim at opposite sides of the bucket to form two lugs for the handle. Add decorative pellets or coils on either side of these lugs, then cut the bucket from the bat and cover it to allow the moisture level to even

**1****2****3**

TIP

When making the hole in the handle, push the rod in about one inch on one end, then do the same from the other end. Alternate from each end until you reach the middle.

out. When the rim is leather hard, punch two holes for the handle bail using a piece of quarter-inch tubing (*figure 2*).

Make a clay handle from a short piece of the same twisted extrusion by rolling it over a “handle roller” (*figure 3*). You can make a handle roller by gluing short pieces of wood trim (quarter round and cove molding) to a board (see inset). Just before the handle reaches leather hard,

make a hole with a metal rod through the length of it.

After firing, insert a 14-inch long brass rod and center it. (Brazing rod works well.) Bend the rod 90° at each end of the handle with your hands. Then, at $\frac{3}{8}$ inch from the end of the rod, use pliers to bend the rod outward at a 90° angle. Thread each end of the rod with a 6-32 metal cutting die. Threaded brass balls from a lamp parts supply company secure the handle to the bucket.



The same three-lobe die (shown here in four sizes) is used to make the rim and the handle. These dies were all made from small pieces of Plexiglas that are inserted in the extruder. Rope dies are easy to make—simply drill three holes, then use a jeweler’s saw to connect the holes and cut away the center part of the die. While the extruded coil does not

look very interesting, once twisted, it has the appearance of three coils twisted together. To achieve this look, twist the top end first, flip the coil over, twist the other end, then twist the middle. You’ll need a 24-inch extrusion to fit a 6-inch pot. Lay the twisted extrusion in a circle on the bat around the base of your pot, then attach it once it has set up a bit.

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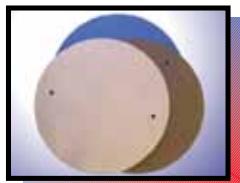
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